This Briefing is Unclassified

Network Electronic Attack Simulator (NEAS)

Presented to ACTD "Breakfast Club"

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Open Discussion of Radio Frequency Weapons

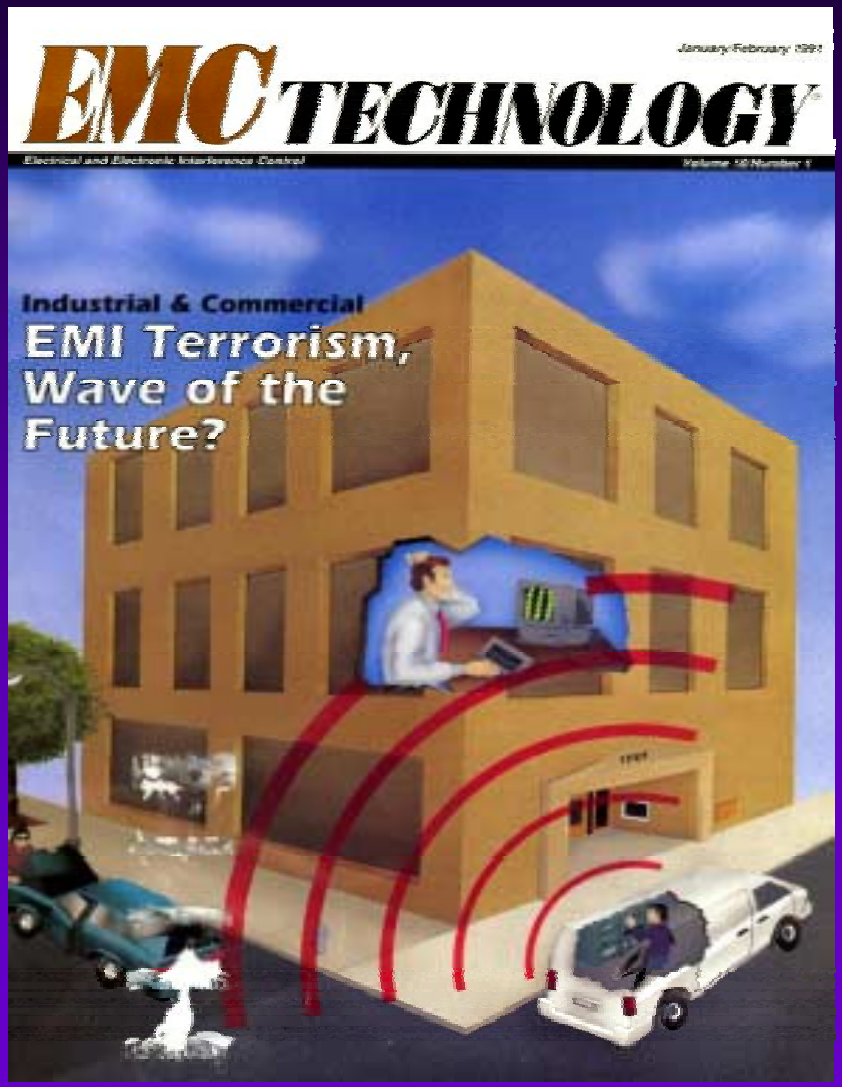
- Much discussion of hardware and tactics on Internet and Trade Journals
- Source information available from Technical Conferences
- High-level interest shown in governmental publications worldwide
  - RFW used as a means of **ASYMMETRIC WARFARE**


The Worldwide Weekly

DEFENSE NEWS

Chinese Covet High-Technology Arsenal

DoD Report Reveals PLA Quest For Robotics, Cyber Warriors



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Need for Network Electronic Attack Simulator (NEAS)

- Assist in evaluating the effects of an RFW on mission and time-critical operations
- Understand how operators react when computer systems fail
- Train operational personnel how to respond when computer systems malfunction
- Provide a tool for use during "Red team" exercises

Joint Air Operations Center-Forward: EFX '98

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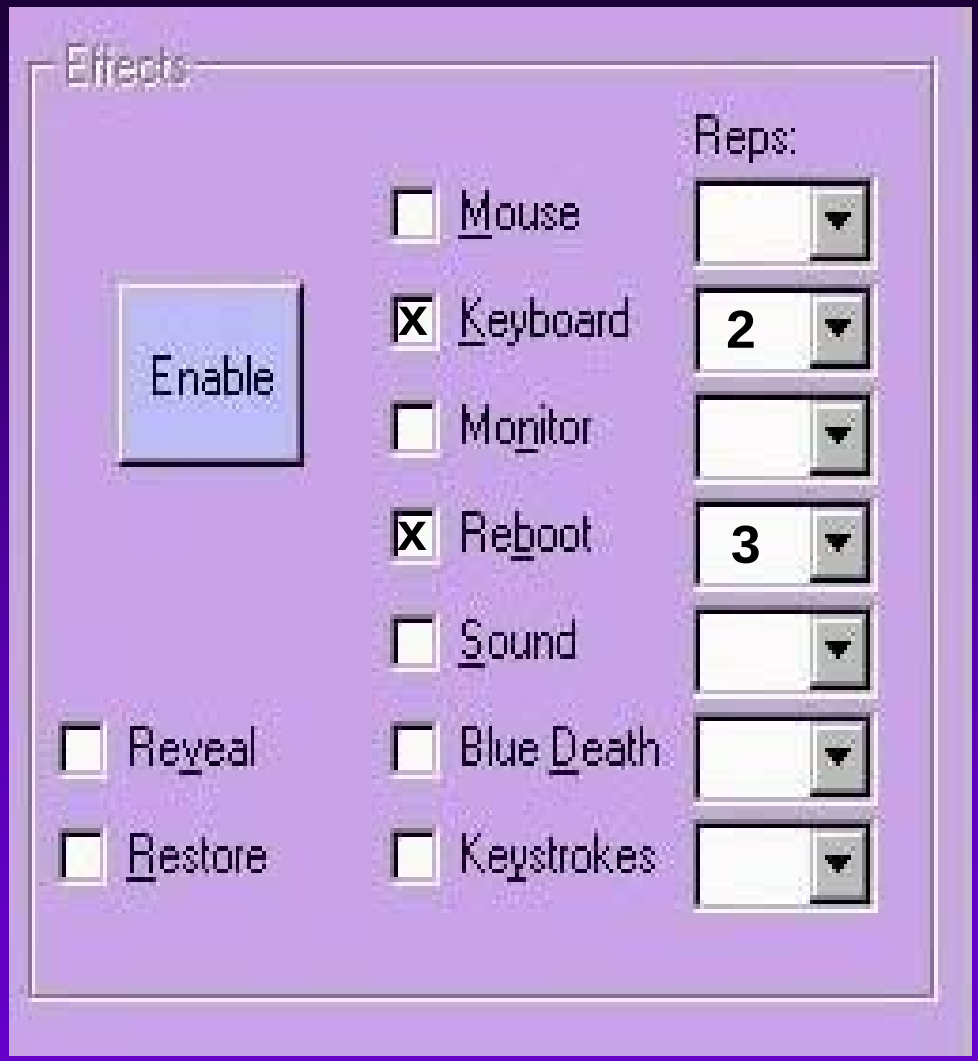
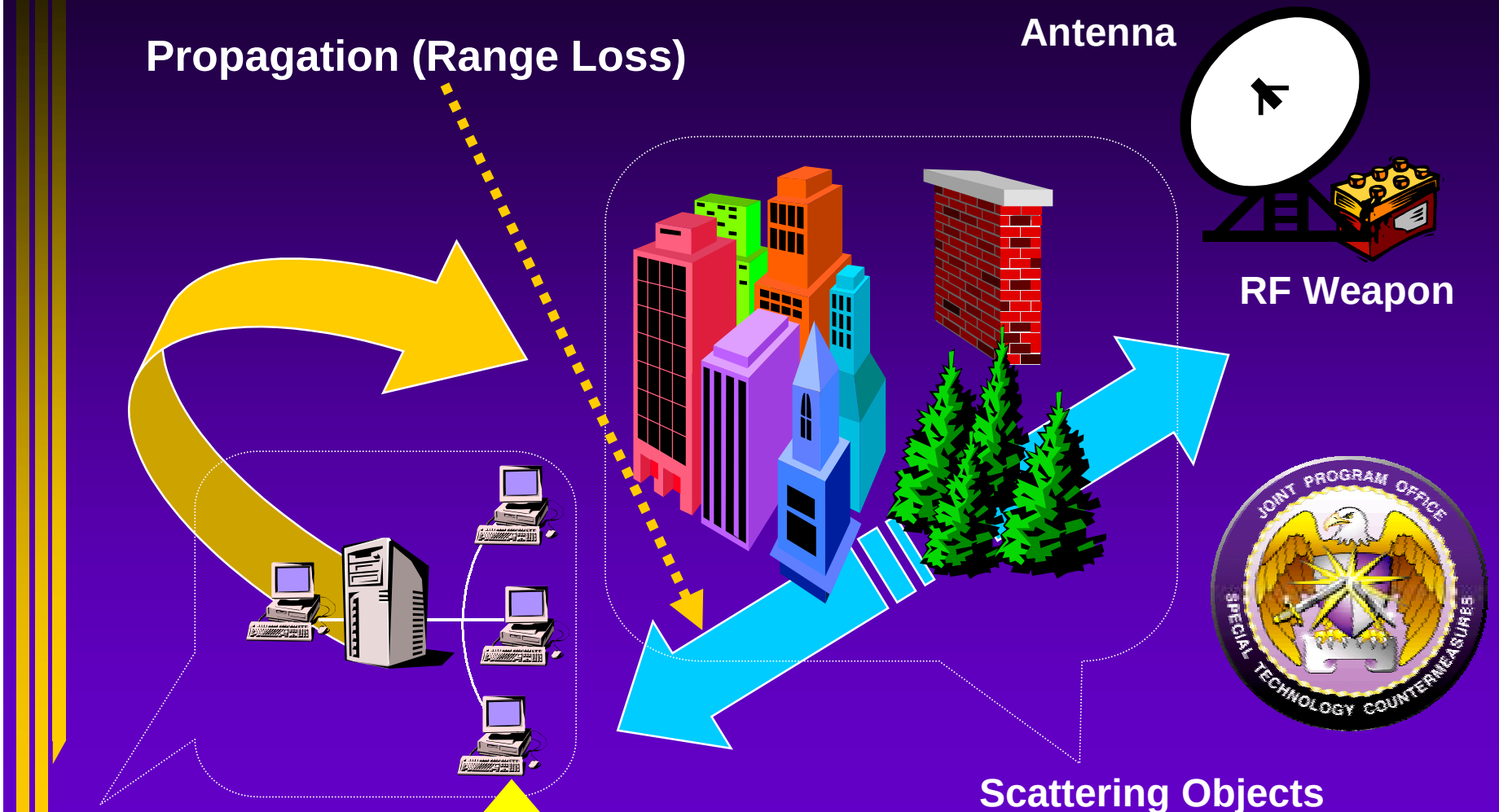
NEAS is a Software Tool that:

- Emulates the effect of an RFW attack on network operations
- Easily installed on the computer systems
- Non-destructive to current software and data when test is complete
- Records the operators response actions to restore the individual systems



Radio Frequency Weapons:
Problem Overview



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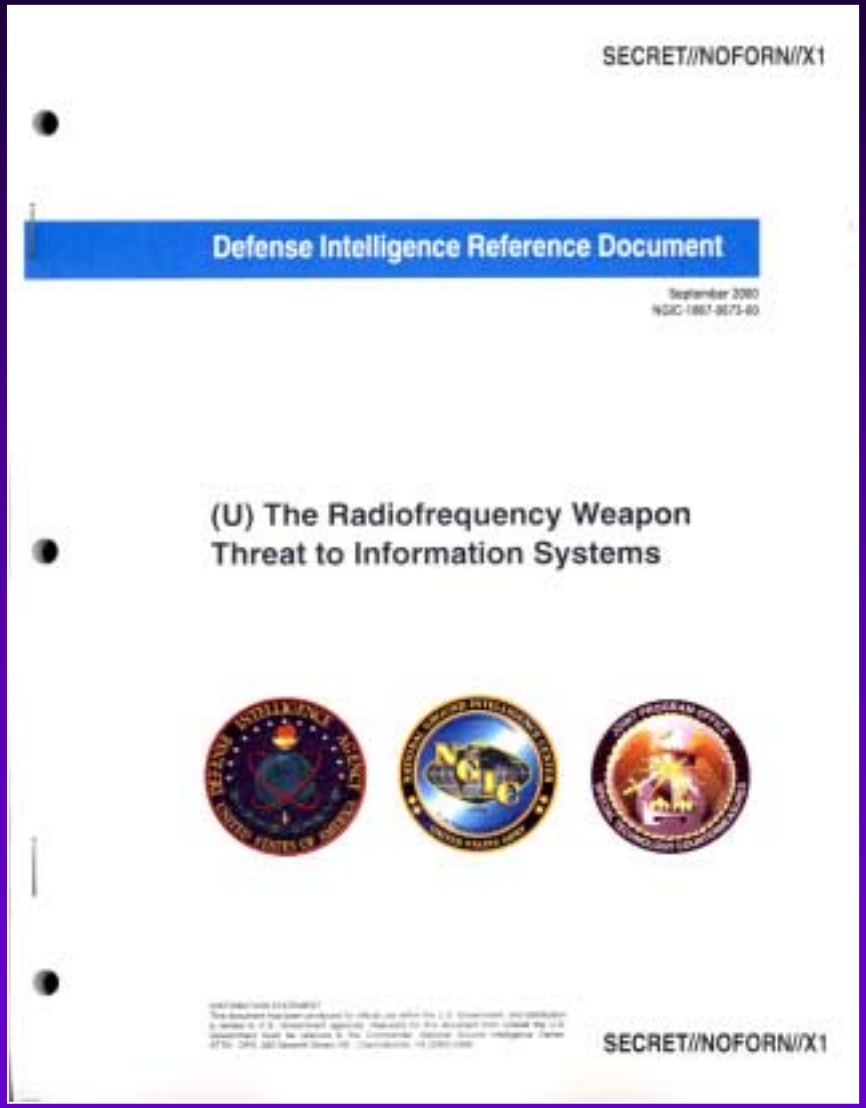
Published NGIC/JPO-STC Threat Document

"(U) The Radiofrequency Weapon Threat to Information Systems," Defense Intelligence Reference Document, NGIC-1867-0673-00, September 2000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Defense Intelligence Reference Document

September 2000
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(U) The Radiofrequency Weapon Threat to Information Systems

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Dahlgren Outdoor RFW Test Site and *Bastille* Target Building

NAVSEA DAHLGREN Surface Warfare Center Division

Target Set

- 65 PC Network
- Fisher Supervisory Control and Data Acquisition (SCADA)
- Nortel PBX (Private Branch Exchange) telecommunications
- ADT Security System

Building Construction

- 12” Block (no rebar)
- Shielded/fiber-optic diagnostics

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Motivation for NEAS

- Two questions
  - What computer systems functions were disrupted?
  - How can we determine the operational impact when those functions are disrupted?


Before RF Illumination


After RF Illumination

Is it feasible to develop a software tool to emulate the effects of an RFW attack?

NEAS Risk Reduction

- Wanted method of extending the effects results to understanding impact of an RF attack on an operational C4I facility
- OSD ADUSD(AT&L)/Advanced Technology and JPO-STC Counter-RF Program provided $300k of “seed” funding to investigate the software approach
- In FY 00/01 NSWCDD performed a low-level risk reduction effort
  - To determine the feasibility of the concept
  - To demonstrate a pre-prototype version

NEAS Software Concept

- Two NEAS programs (Server and Client)
- Server Program
  - Installs on the network server or on an additional machine attached to the network
  - Provides menu for “Red Team” to select particular disruptions to simulate on each client
  - Maintains a list of all clients currently connected
  - Schedules time of attacks on each client
  - Provides analysis of the reactions of the operators to the attack
  - Can be separate machine attached to the network behind the firewall

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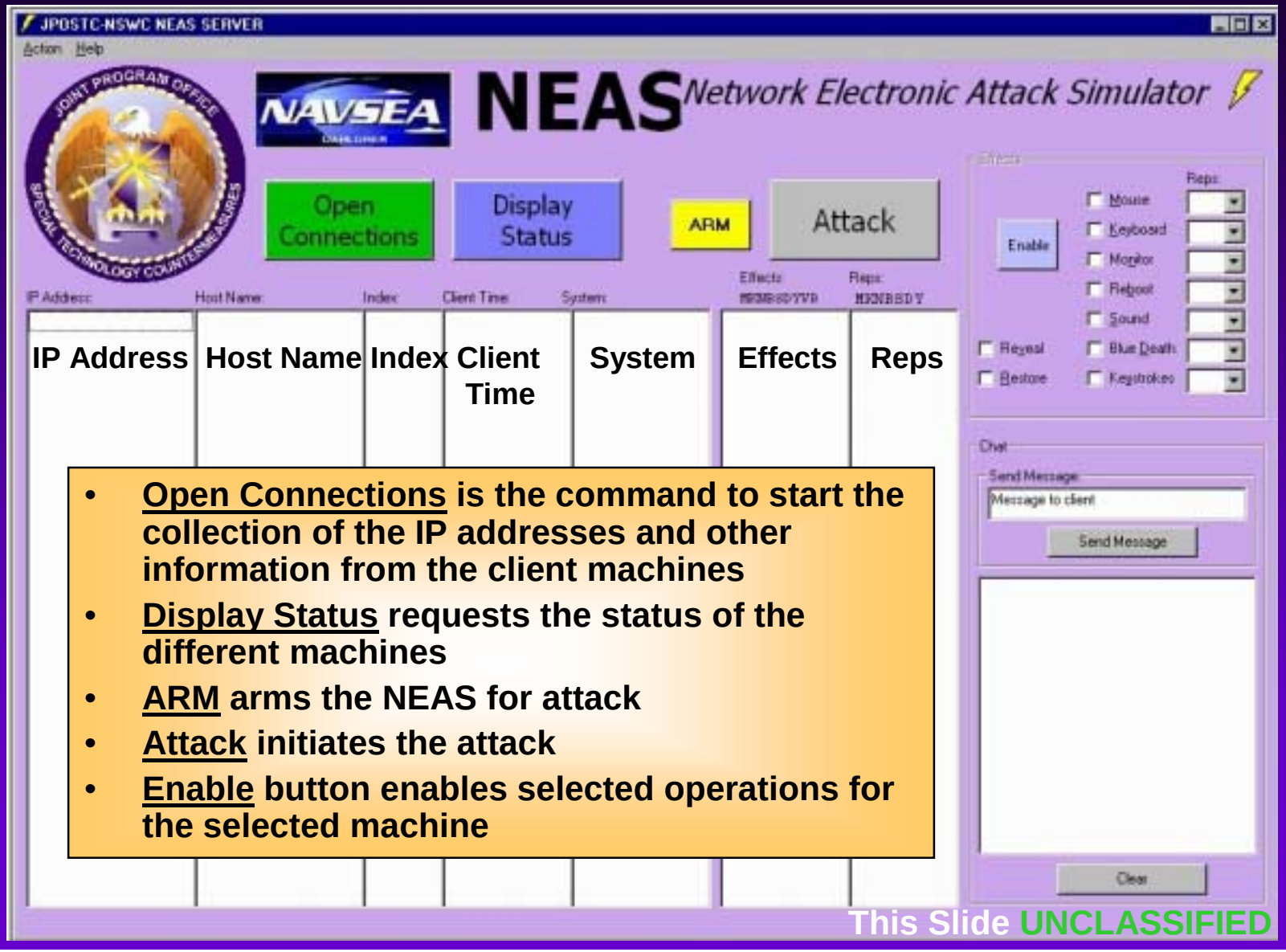
NEAS Server Control Window



- Open Connections is the command to start the collection of the IP addresses and other information from the client machines
- Display Status requests the status of the different machines
- ARM arms the NEAS for attack
- Attack initiates the attack
- Enable button enables selected operations for the selected machine

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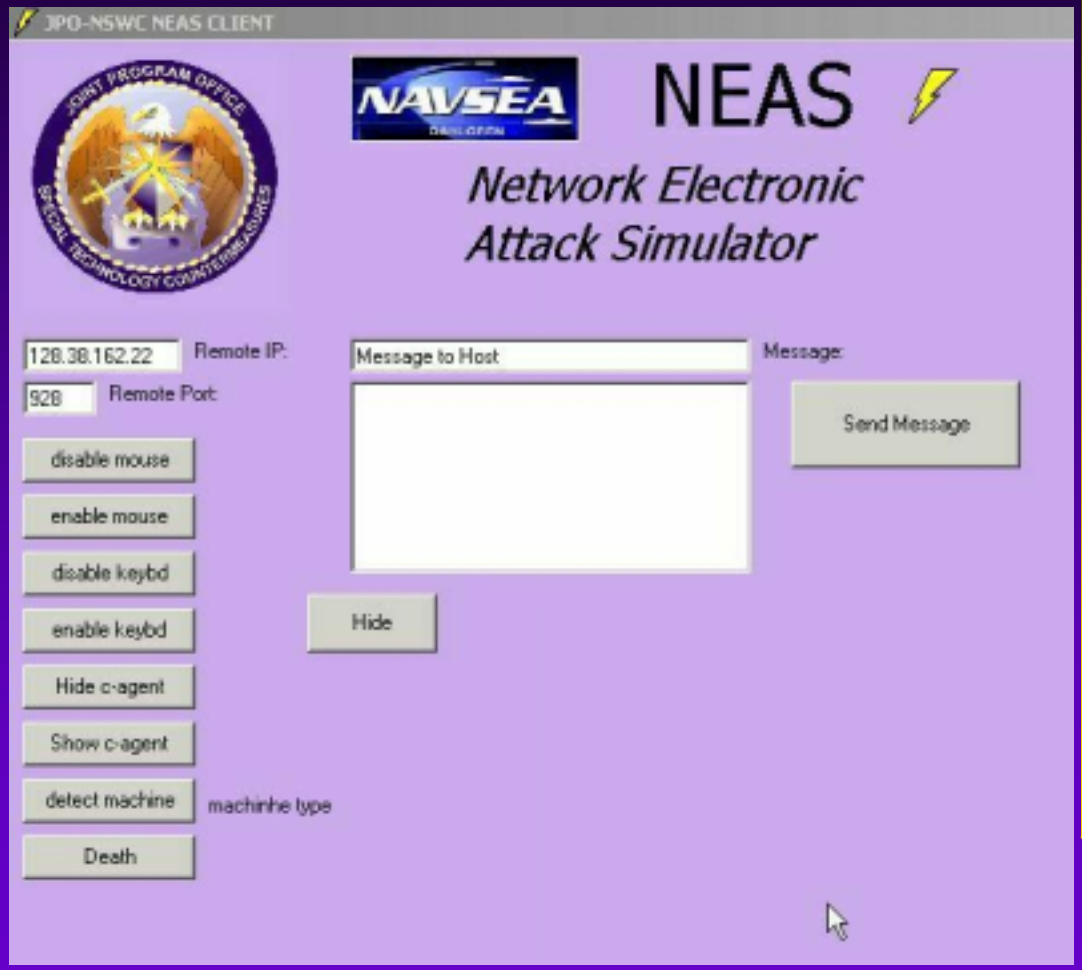
Client Program

- **Client Program**
  - Downloads onto the user or target machines in the network from the Server
  - Performs the requested scheduled disruptions commanded by the NEAS Server
  - Records the actions taken by the operator
  - At turn-on Client program informs the NEAS Server of its presence
  - Client program is completely hidden from user

Client Window

- Client window is hidden from the user
- Used for debugging and checking network functions
- Allows user position to cause the basic failures to own machine



Development Approach

- Use spiral development methodology
- Program in Visual Basic and C++
- Use Web Gain Studio for development environment and documentation
- Establish complete UML model with embedded source code
- Establish formal testing on a variety of PCs
- Initially develop NEAS for PCs running Windows 95/98/2000
- Follow with development of a UNIX version for SUNs

Development Status

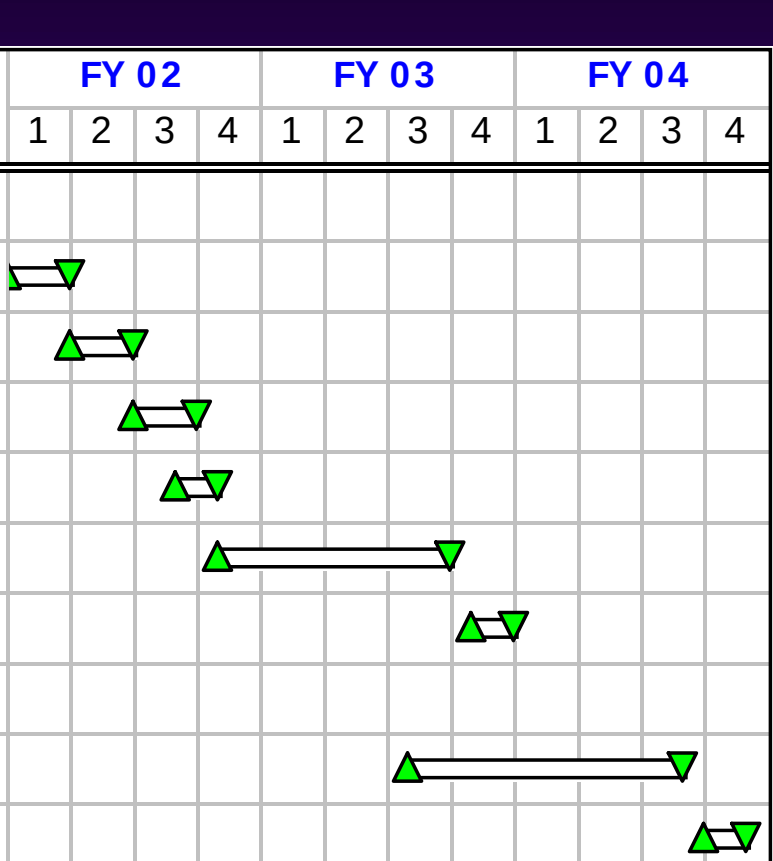
- Established UML model with case, class, and sequence diagrams
- Developed capability to display a client screen on NEAS server
- Developed basic recording capability for client keystrokes and mouse clicks
- Demonstrated NEAS operation on a number of PCs - both desktops and laptops running Windows 95/98/2000 using Visual Basic
  - Allowed us to test the “effects” on different computers
  - Provided feedback on requirements for specific machine characteristics

Plans for Prototype

- Change language from Visual Basic to JAVA
- Automate the download of NEAS Client program from the NEAS Server
- Remove visible indicators that NEAS is running on the client machine
- Develop the initial “operator-event report”
  - Displays the attack information and timing
  - Shows the operations performed in attempting to diagnose/fix the problem, e.g.:
    - Ctrl-Alt-Del
    - Reset Button
    - Cycle Power
  - Provides a means to gage operator response

Proposed Schedule

NEAS Development	FY 02				FY 03				FY 04			
	1	2	3	4	1	2	3	4	1	2	3	4
Phase 1												
Complete development of Feasibiity Prototype												
Install and test on a non operational network												
Demonstrate and test prototype												
Update requirements												
NEAS II development												
Demonstration												
Phase II												
Development of UNIX NEAS												
Demonstration												
	1	2	3	4	1	2	3	4	1	2	3	4



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Residuals

- Have available tested “shrink wrapped” CD version to provide to user community
- Provide a beta-test version to interested parties that use machines on which it has not been tested
- Continued support by JPO-STC for 2 years after ACTD completion:
  - Upgrades for particular machines used in specific exercises
  - Provide telephone assistance to users

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Funding Requirement

Program Phase	FY 02	FY 03	FY 04
Phase I			
Feasibility Prototype and Demonstration	$650		
Prototype II and Demonstration	$100	$650	
Phase II			
Development of UNIX NEAS		$400	$850
Demonstration			$125
Total Program Cost	**$750**	**$1,050**	**$975**
JPO-STC Funding	**$150**	**$150**	**$150**
AFRL/IFED funding	**$200**	**$200**	**$200**
ACTD Funding Requirement	**$400**	**$700**	**$625**

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Sponsorship

- Current Sponsors:
  - JPO-STC
  - AFRL/IFED
- Potential Additional Sponsors, having on going discussions:
  - OPNAV N70 and N64
  - USSOCOM/Advanced Technology
  - JWAC/JEMNA/JCOTES
- Potential User Sponsor: SOCOM

Summary

- NEAS is a promising operational training tool
- Relatively inexpensive compared to most software development projects
- Value will be demonstrated when “Red-Teamed” during a training exercise

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